SPRING CLASSIFICATION COUNTS

OF THE

BLUENOSE CARIBOU HERD

MARCH 1989

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SPRING CLASSIFICATION COUNTS OF THE BLUENOSE CARIBOU HERD MARCH 1989

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The interpretations presented in this report are those of the authors and do not necessarily reflect those of the Department.

ABSTRACT

Classification counts of the Bluenose caribou were conducted 7-13 March 1989. Caribou were concentrated in two areas: 1) east of Sitidgi Lake and 2) on both sides of the Anderson River above the Forks. Of 3427 caribou over 1 year old, 27% were male. The mean calf/100 one-year+ females ratio was 44.7 $\pm$ 3.04 (S.E.) using the Jackknife method to calculate variance. Assuming an initial calf production of 72 calves/100 females and female survival from June 1988 of 93%, the survival rate of calves from June/88 to March/89 was 58%. The mean yearling/100 two-year + females ratio was 11.1 $\pm$ .16 (S.E.). After correcting for the unrepresented male segment of the population, calves and yearlings comprised 21% and 5%, respectively. A single wolverine and no wolves were observed during the survey.

TABLE OF CONTENTS

ABSTRACT iii

LIST OF FIGURES vii

LIST OF TABLES ix

INTRODUCTION 1

STUDY AREA 2

METHODS 4

RESULTS 5

DISCUSSION 10

ACKNOWLEDGEMENTS 12

LITERATURE CITED 13

Appendix A. Location, method and observer of groups classified during the spring composition survey of the Bluenose caribou herd, March 1989. 15

Appendix B. Calculation of Bluenose caribou age and sex composition, spring 1989. 17

Appendix C. Cost of the March 1989 Bluenose composition survey. 19

Appendix D. Field schedule of the March 1989 Bluenose composition survey. 20

LIST OF FIGURES

Figure 1. Range and general calving area of the Bluenose caribou herd in the NWT 3

Figure 2. Bluenose caribou classification sites east of Sitidgi Lake, NWT, March 1989 6

LIST OF TABLES

Table 1. Bluenose caribou herd spring classification summary, March 1989 7

Table 2. Composition of the Bluenose caribou herd, 1983 to 1989 11

INTRODUCTION

The Bluenose herd is one of the major herd of barren-ground caribou (Rangifer tarandus groenlandicus) in the Northwest Territories. Effective management of barren-ground caribou populations requires knowledge of herd size (population estimate) and structure (age and sex composition). Data on herd structure is obtained through spring composition counts. Bluenose herd composition surveys were first conducted in 1983 (Williams and Elliot 1985) and then annually from 1986 (McLean and Heard 1991, McLean and Jackson in prep.). This report presents the results of the 1989 spring composition survey.

STUDY AREA

The Bluenose population ranges north of Great Bear Lake between the Mackenzie and Coppermine rivers (Figure 1). The region consist of rolling or undulating till plain, numerous lakes and ponds, and several major drainage systems. The area has a polar continental climate typified by long, cold winters and cool, short summers (Carruthers and Jakimchuk 1981).

A portion of the study area is beyond the limit of the trees and consists of tundra and barrens. The remainder is treed, the vegetation being predominantly open and sparse black spruce (Picea mariana) forest with a ground cover of mosses and lichens (Canada Forest Management Institute 1974, Jacobson 1979).

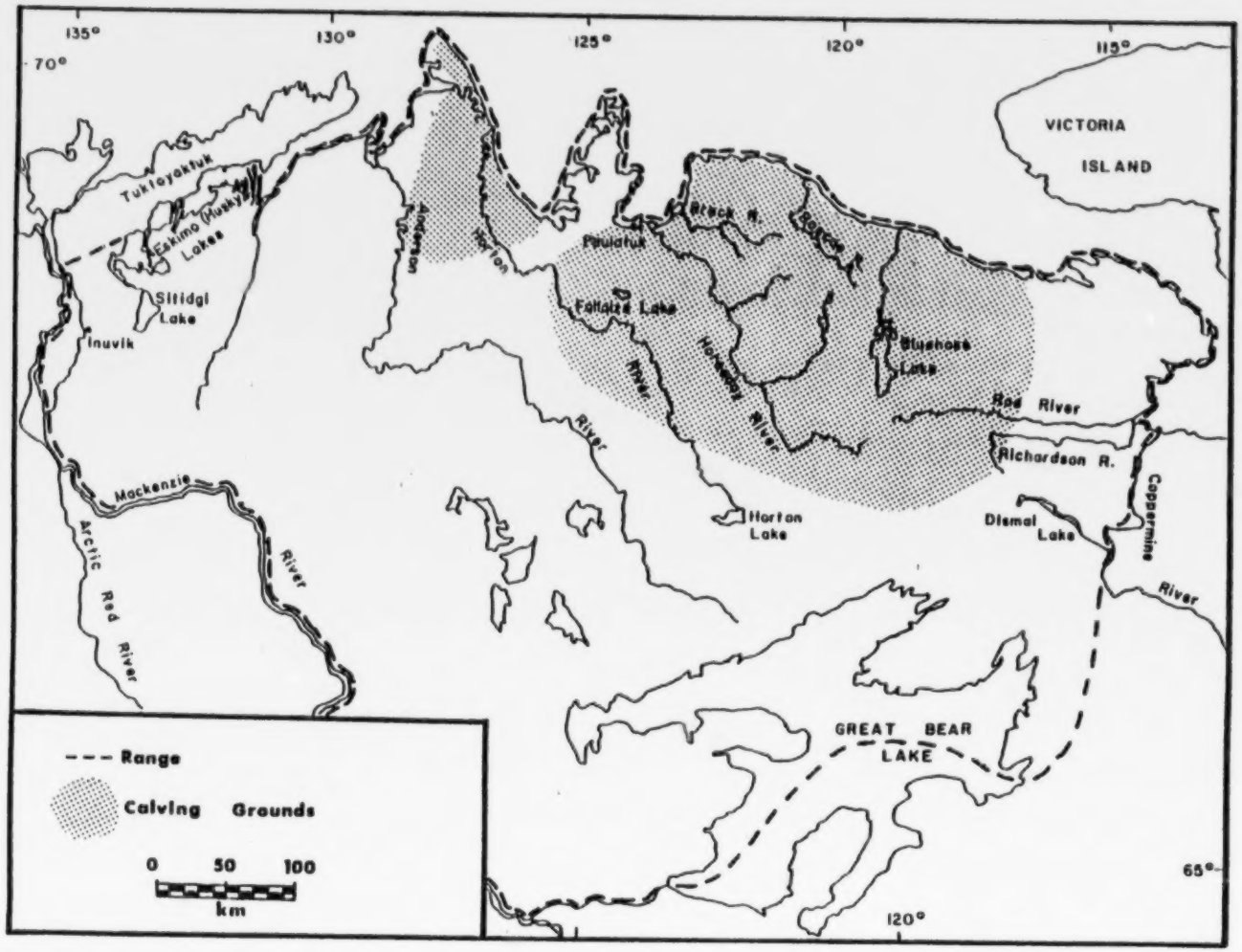

Figure 1. Range and general calving area of the Bluenose caribou herd in the NWT.

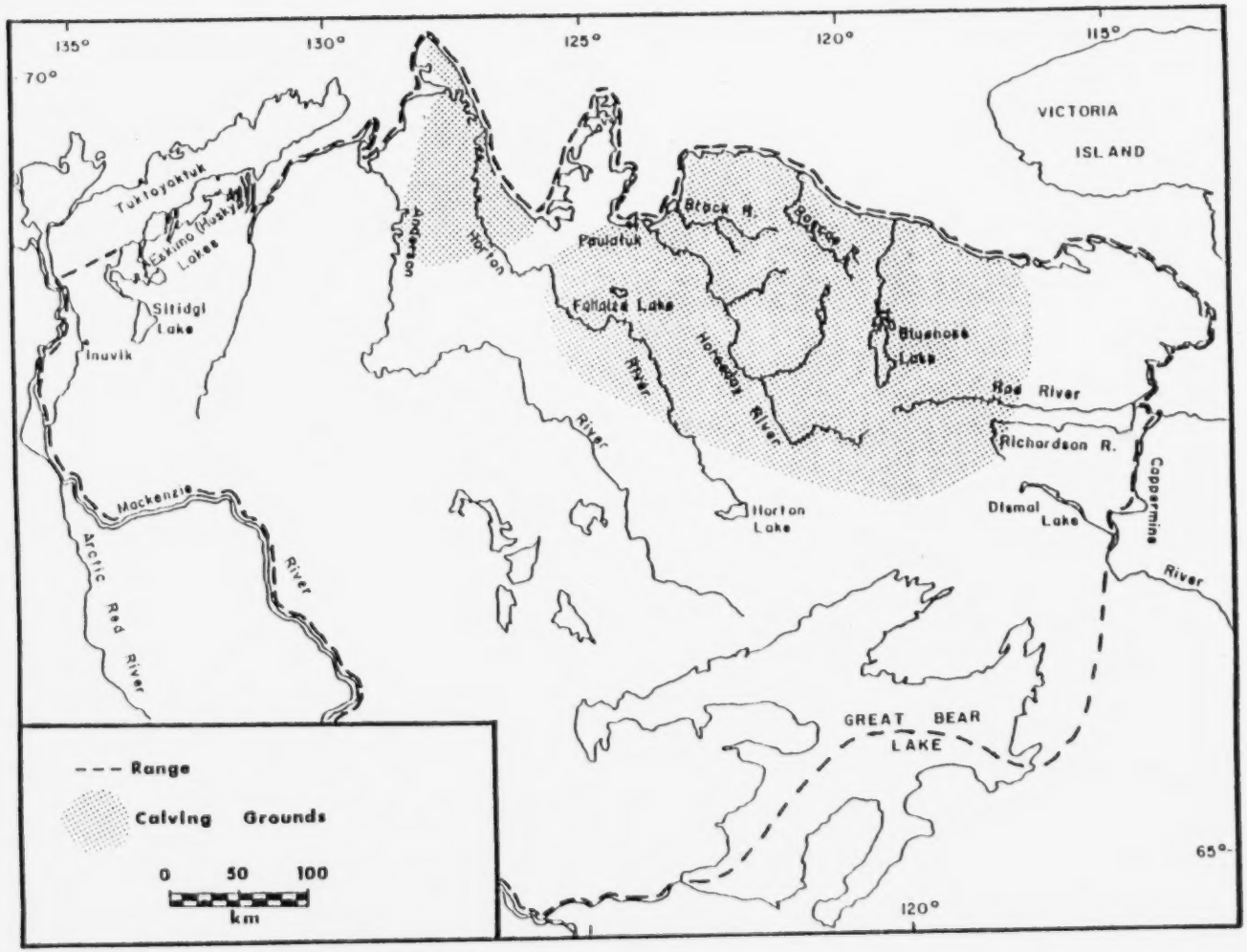

Figure 1. Range and general calving area of the Bluenose caribou herd in the NWT.

METHODS

Fixed-winged aircraft (Cessna 310 and Cessna 185) equipped with a scanner/receiver and two dual element antennae were used to locate radio-collared caribou within the forested winter range. Flights were conducted in October, November and February in conjunction with monitoring of radio-collared wolves. An additional radio-tracking flight on 3 March 1989 was required to locate collared caribou not found during the wolf surveys.

Previous spring composition surveys of the Bluenose herd attempted to improve sampling methods and statistical analysis (McLean and Heard 1991). A minimum of 30 groups (100 animals per group) was recommended for sampling effort. This gave an acceptably precise estimate of the calf/cow ratio and its associated variance (Mclean and Heard 1991). We classified groups from the ground wherever possible or by helicopter when tree cover and/or small lakes restricted our ability to land. Small groups were classified from the air. Group selection was arbitrary, but the area was changed daily to spread out the sampling effort and to avoid double counting. Classification methods were the same as in previous composition surveys (Williams and Elliot 1985, McLean and Heard 1991). The Jackknife Method (Sokal and Rohlf 1981) was used to calculate the ratio and associated variance of calves to 100 one-year plus females.

RESULTS

Two major concentrations of caribou were located in the study area: one east of Sitidgi Lake, and the second above the Anderson River forks (Figure 2). Small groups of animals were widely distributed throughout the forested winter range from Sitidgi Lake to the Anderson River.

The majority of animals were classified from the air. A large number of small groups was located northwest of Simpson Lake. The location and size of these groups made it difficult to do from the ground.

We classified 4548 animals in 57 groups between March 7-13, 1989 (Table 1). Males comprised 27% of the 3427 caribou one year old or older. The ratio of 1+ males/100 1+ females was 38 $\pm$ .74 S.E. Calves comprised 24.5% of the total and the calf/100 1+ females ratio was 44.7 $\pm$ 3.04 S.E. while yearlings accounted for 6% and the yearling/100 2+ cows was 11.1 $\pm$ .16 S.E.

The male segment of the population is underrepresented during spring class counts because our effort is concentrated on the calf/cow groups. Mature bulls generally winter farther west and south of cow groups (Carruthers and Jakimchuk 1981). We assume the fall 1978 estimate of 73 1+ males/100 1+ females (Brackett et al. 1982) is representative of the sex ratio of the Bluenose caribou herd and have revised our calculations accordingly (Appendix B). The revised estimate of calves and yearlings in the population is 21% and 5%, respectively.

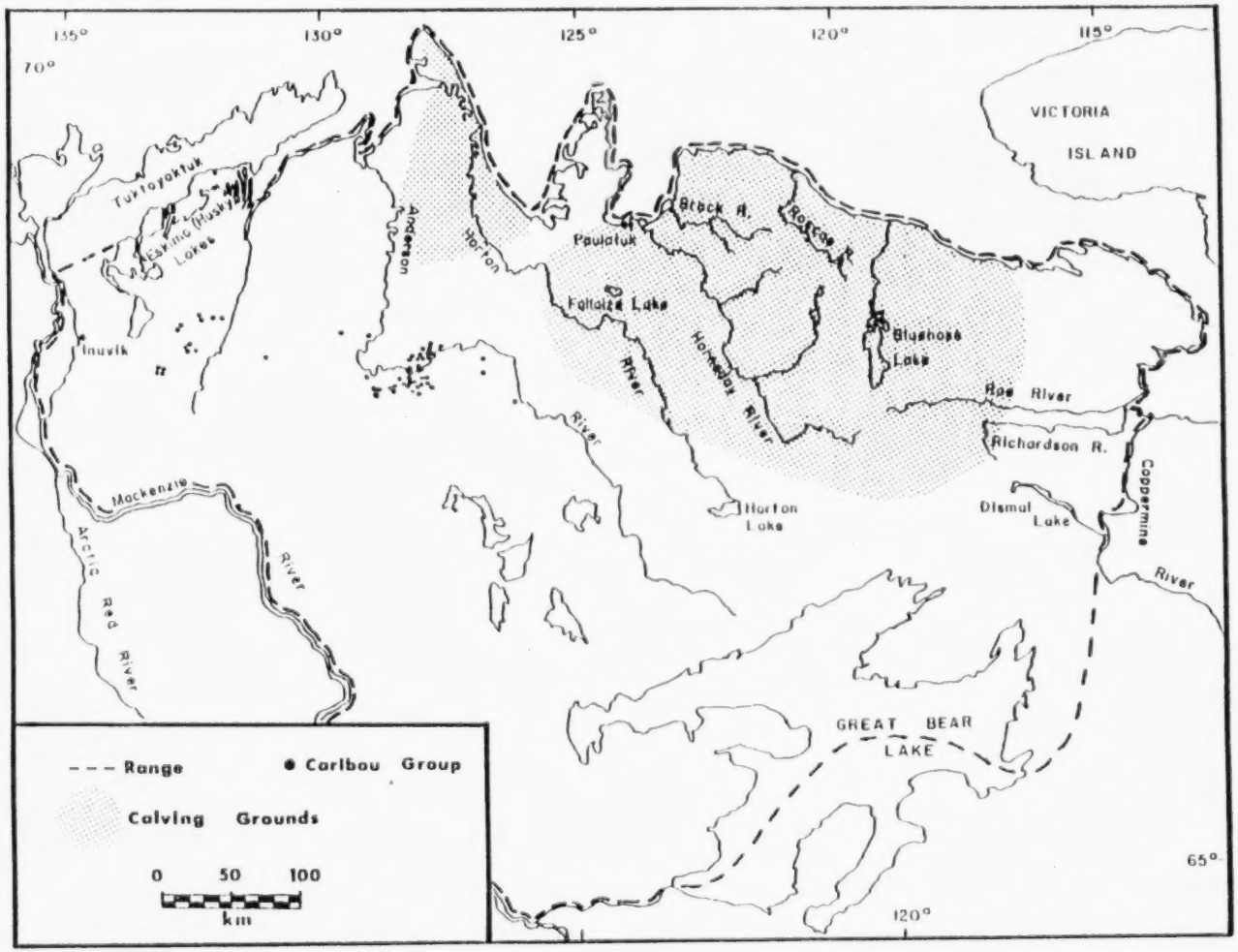

Figure 2. Bluenose caribou classification sites east of Sitidgi Lakes, NWT., March 1989.

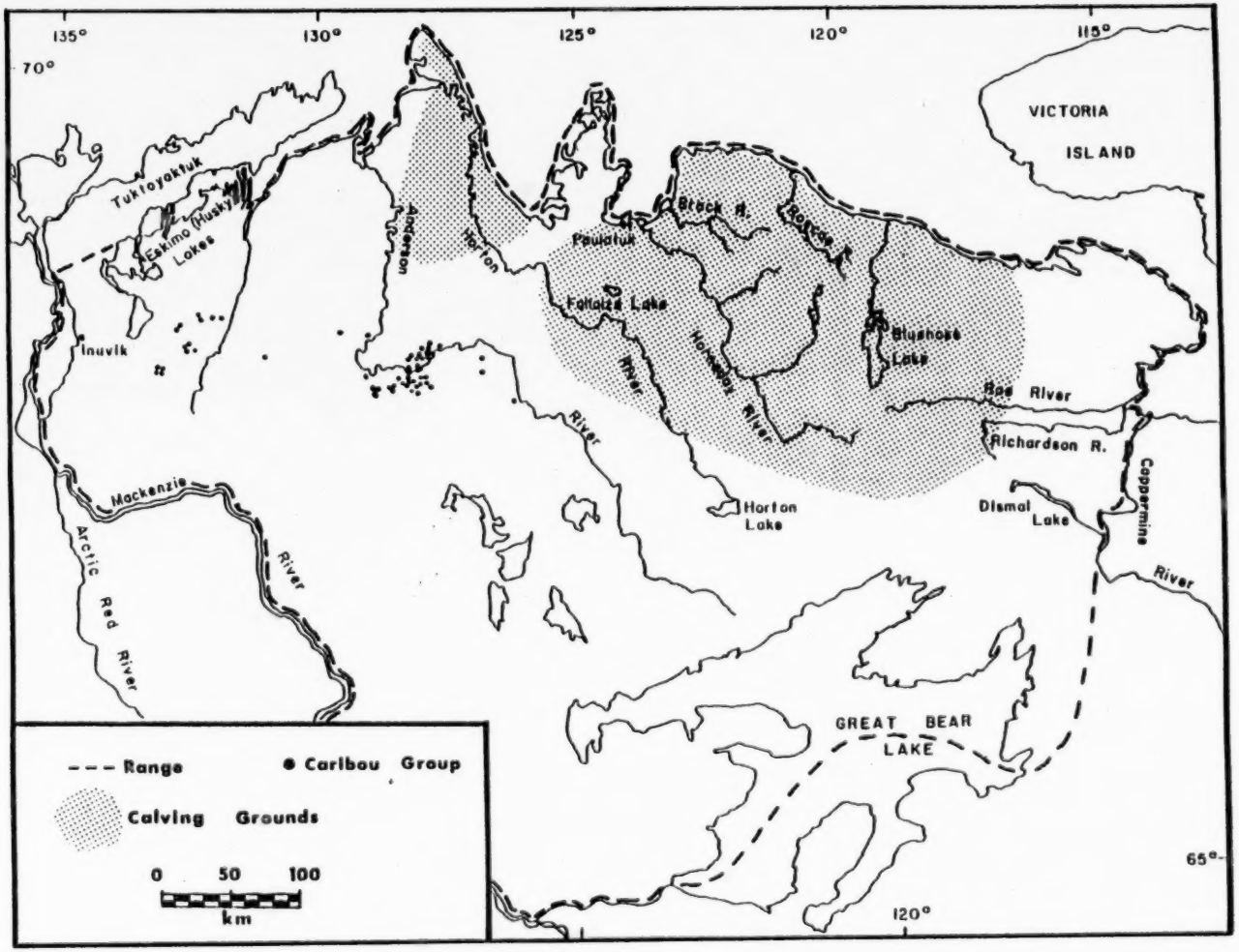

Figure 2. Bluenose caribou classification sites east of Sitidgi Lakes, NWT., March 1989.

Table 1. Bluenose caribou herd spring classification summary, March 1989

Date	Grp	Cows	Calves			Yearling			Males		Total
			M	F	U	M	F	U	Y	M	
Mar. 7	1	0	0	0	0	0	0	0	0	17	17
	2	5	1	1	0	2	0	0	0	0	9
	3	5	0	0	4	0	1	0	3	16	29
	4	71	14	11	18	0	1	0	5	4	124
	5	99	16	24	16	9	7	2	31	3	207
	6	48	6	6	1	5	3	0	18	5	92
Mar. 8	7	7	7	4	1	4	1	0	19	9	52
	8	11	8	3	2	4	3	0	9	0	40
	9	18	9	3	1	4	1	0	24	3	63
	10	18	18	5	4	4	4	0	60	12	125
Mar. 9	11	32	6	6	0	0	2	0	1	0	47
	12	131	22	10	6	5	2	0	7	11	184
Mar.10	13	66	2	2	8	1	2	0	0	0	81
	14	33	0	0	7	0	1	0	1	0	42
	15	83	7	0	21	3	3	0	20	0	137
	16	129	29	21	11	3	6	0	12	2	213
	17	99	24	16	1	10	6	1	66	3	226
	18	22	3	2	0	2	5	0	29	0	63
	19	77	11	16	1	2	4	0	12	1	124
	20	9	2	3	0	0	0	0	0	0	14
	21	51	9	6	0	1	2	1	9	1	80
	22	20	0	2	1	0	1	0	6	1	31
	23	139	18	19	1	4	6	0	19	1	207
	24	29	4	5	0	0	0	0	0	0	38
	25	18	0	4	0	0	2	0	2	0	26
	26	7	2	5	0	0	1	0	1	0	16
	27	65	11	8	0	1	4	0	1	0	90
Mar.20	28	48	14	23	2	2	3	0	19	0	111
	29	22	6	7	0	0	1	0	9	1	46
	30	18	1	2	3	0	0	0	5	1	30
	31	37	9	14	0	1	3	0	8	0	72

Table 1. continued.

Date	Grp	Cows	Calves M	Calves F	Calves U	Yearling M	Yearling F	Yearling U	Males Y	Males M	Total
	32	38	8	8	0	1	4	0	9	0	68
	33	24	7	11	0	1	1	0	1	0	45
	34	18	4	9	0	0	1	0	7	0	39
	35	15	1	2	0	0	1	0	3	4	26
	36	22	6	8	0	1	1	0	4	1	43
	37	104	24	13	4	7	10	1	21	8	192
	38	11	1	4	2	1	0	0	1	0	20
	39	121	19	18	0	5	2	0	19	0	184
	40	67	12	5	2	0	1	0	7	0	94
	41	49	9	9	0	0	2	0	11	0	80
	42	17	3	7	3	0	0	2	3	0	33
	43	16	8	8	0	1	2	0	29	18	82
	44	41	21	16	2	9	4	0	31	3	127
	45	31	4	6	0	0	0	0	9	3	53
	46	6	1	3	0	0	1	0	4	0	15
	47	2	2	1	0	0	0	0	7	2	14
	48	12	3	5	0	1	1	0	8	2	32
	49	94	26	34	1	5	7	0	26	4	197
Mar.12	50	45	11	11	0	3	5	0	1	0	76
	51	40	10	17	0	4	4	0	5	1	81
	52	3	0	2	0	1	1	0	5	0	12
Mar.13	53	3	4	1	0	0	1	0	3	3	15
	54	18	7	4	0	0	2	0	16	1	48
	55	49	24	15	1	4	7	0	18	7	125
	56	52	25	16	3	3	6	0	21	5	131
	57	31	14	15	0	2	2	0	12	4	80
Total		2346	513	473	130	116	141	5	677	147	4548

Other Wildlife Observed

No wolves were observed during the 33 hour survey, although tracks were encountered on one lake during ground classification. A wolverine was observed on a lake (68°34' x 128°45') on March 12.

DISCUSSION

The March 1989 distribution of Bluenose caribou was consistent with winter surveys conducted by previous investigators (Carruthers and Jakimchuk 1981, Williams and Elliot 1985, Carruthers et al. 1986, McLean and Heard 1991, McLean and Jackson in prep.).

The 1+ male/100 1 ± females ratio of 38 is considerably lower than Brackett et al.'s (1982) fall 1987 estimate of 73, but is similar to the estimated March sex ratios since 1983. The calf/100 1+ females ratio does not differ appreciably from previous years (Table 2). Assuming an initial calf production of 72 calves/100 cows (Parker 1972) and female survival from June/88 of 93% (Heard and Calef 1979), then calf survival from June/88 to March/89 was 58% (Appendix B). This is similar to overwinter survival rates observed in 1983 (Williams and Elliot 1985) and 1988 (McLean and Jackson in prep.) but lower than rates from 1986 and 1987 (McLean and Heard 1991). The reason for the higher calf survival rates in 1986 and 1987 is unknown but could be due to a number of factors (e.g., predation, selection of groups). In 1986 and 1987, classification was conducted on collared and non-collared animals. There may have been higher numbers of calves in groups with collared cows. Larger mixed groups contain more nonbreeders or cows who have lost calves.

Table 2. Composition of the Bluenose caribou herd, 1983 to 1989

Date	Calves/ 100 1+ cows (% Calves)	Yearlings/ 100 2+ cows (% yrlgs)	% overwinter calf survival[a]	Source
Mar/83	44 (22)	18 (9)	59	b
Mar/86	55 (26)	13 (5)	71	c
Mar/87	45.8 (23)	14 (6)	75	c
Mar/88	46 (24)	19 (9)	59	d
Mar/89	44.9 (24)	11 (6)	58	This Study

a Assuming 72 calves/100 cows in June (Parker 1972, Dauphine 1976).
b Williams and Elliot (1985)
c McLean and Heard (1991)
d McLean and Jackson (in prep.)

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Appendix A. Location, method and observer of groups classified during the spring composition survey of the Bluenose caribou herd, March 1989.

Date	Grp.	Location	Method	Observer
Mar.7	1	68 30 x 132 00	Air	MW
Mar.7	2	68 30 x 132 00	Air	MW
Mar.7	3	68 35 x 131 37	Air	MW
Mar.7	4	68 35 x 131 37	Air	MW
Mar.7	5	68 35 x 131 15	Ground	MW/PF
Mar.7	6	68 35 x 131 25	Ground	MW/PF
Mar.8	7	68 13 x 132 13	Air	MW
Mar.8	8	68 13 x 132 13	Air	MW
Mar.8	9	68 13 x 132 13	Air	MW
Mar.8	10	68 13 x 132 13	Air	MW
Mar.9	11	68 22 x 126 41	Air	MW
Mar.9	12	68 27 x 126 43	Air	MW
Mar.10	13	68 31 x 127 36	Air	MW
Mar.10	14	68 32 x 127 35	Air	MW
Mar.10	15	68 30 x 127 36	Ground	MW/PF
Mar.10	16	68 30 x 127 35	Air	MW
Mar.10	17	68 30 x 127 41	Ground	MW/PF
Mar.10	18	68 29 x 127 36	Air	MW
Mar.10	19	68 28 x 127 45	Air	MW
Mar.10	20	68 27 x 127 46	Air	MW
Mar.10	21	68 26 x 127 54	Air	MW
Mar.10	22	68 27 x 127 52	Air	MW
Mar.10	23	68 21 x 127 56	Air	MW
Mar.10	24	68 22 x 127 45	Air	MW
Mar.10	25	68 26 x 127 39	Air	MW
Mar.10	26	68 26 x 127 36	Air	MW
Mar.10	27	68 31 x 127 22	Air	MW
Mar.11	28	68 17 x 127 35	Air	MW
Mar.11	29	68 18 x 127 36	Air	MW
Mar.11	30	68 19 x 127 38	Air	MW
Mar.11	31	68 19 x 127 39	Air	MW
Mar.11	32	68 18 x 127 43	Air	MW
Mar.11	33	68 18 x 127 46	Air	Mw
Mar.11	34	68 17 x 127 48	Air	MW
Mar.11	35	68 17 x 127 50	Air	MW
Mar.11	36	68 17 x 127 50	Air	MW
Mar.11	37	68 18 x 127 54	Ground	MW
Mar.11	38	68 18 x 127 55	Air	MW
Mar.11	39	68 19 x 127 55	Air	MW
Mar.11	40	68 17 x 127 59	Air	MW
Mar.11	41	68 18 x 128 03	Air	MW
Mar.11	42	68 17 x 127 58	Air	MW
Mar.11	43	68 15 x 128 13	Air	MW

Appendix A. continued.

Date	Grp.	Location	Method	Observer
Mar.11	44	68 15 x 128 14	Air	MW
Mar.11	45	68 18 x 128 39	Ground	MW/PF
Mar.11	46	68 14 x 128 29	Air	MW
Mar.11	47	68 13 x 128 29	Air	MW
Mar.11	48	68 14 x 128 28	Air	MW
Mar.11	49	68 16 x 128 09	Air	MW
Mar.12	50	68 11 x 126 06	Air	MW
Mar.12	51	68 34 x 128 39	Air	MW
Mar.12	52	68 35 x 129 10	Air	MW
Mar.13	53	68 24 x 131 47	Air	MW
Mar.13	54	68 23 x 131 49	Air	MW
Mar.13	55	68 22 x 131 48	Air	MW
Mar.13	56	68 22 x 131 43	Air	MW
Mar.13	57	68 23 x 130 29	Air	MW

Appendix B. Calculation of Bluenose caribou age and sex composition, spring 1989.

Sex ratio of animals over 1 year old

677 young bulls + 147 mature bulls + 116 yearling males = 940 1+ males.
2346 mature cows + 141 yearling females = 2487 1+ females.
% 1+ males = 940/(940+2487) = 27.4
% 1+ females = 2487/(940+2487) = 72.6
Sex ratio = 27.4/72.6 x 100
= 37.8 ± .74 (x ± S.E.) 1+ males/100 1+ females (Cochran 1977)

Percentage of calves and ratio of calves to 1+ females

% calves = 1116 calves/4548 caribou x 1000 = 24.5
ratio of calves/100 1+ females = 44.9 ± .41 (x ± S.E.)

Percentage of yearlings and ratio of yearlings to 2+ females

% yearlings = 262 yearlings/4548 caribou x 100 = 5.8
ratio of yearlings/100 2+ females = 11.1 ± .16 (x ± S.E.)

Survival of calves from birth to April

Assume a) initial calf production of 72 calves/100 females (Parker 1972) and
b) female survival from June to March of 93% (Heard and Calef 1986).
Y cows in June x .93 = 100 cows in March
Y = 100/.93 = 108 June cows = 100 March cows
72 calves/100 cows (Parker 1972) x 108 June cows = 78 calves/1000 March cows
Observed calf/100 1+ March females = 45 calves
% calf overwinter survival rate = 45/78 x 100 = 58

Correction for underrepresented male segment of the population

Brackett et al. (1982) found 73 1+ males/100 1+ females (58% females) in fall 1978.
73/100 x 2487 1+ females = 1816 1+ males
We found 940 1+ males, therefore, add (1816-940) = 876 males
Total caribou = 4548 +876 = 5424
a) corrected % calves = 1116 calves/5424 caribou = 20.6
b) corrected % yearlings = 262 yearlings/5424 caribou = 4.8

Appendix B. continued.

Sex ratio of unclassified calves

Classified calves = 513 males and 473 females
% female calves = 473/(513+473) = 48% females
130 unclassified calves x .48 = 62 females calves
Number of male calves = 130-62 = 68
Calf sex ratio = 513+68 males/473+62 females
= 108 males/100 females

Appendix C. Cost of the March 1989 Bluenose composition survey.

Item	Cost (x $1,000)
Radio-tracking (C-185 6.4 hr)	1.5
Helicopter (Bell 206B 33 hrs)	14.8
Fuel purchase (8 drums)	1.7
Fuel caching (Twin otter 2.5 hrs)	2.5
Travel	1.1
Food and supplies	0.5
Total	22.1

Appendix D. Field schedule of the March 1989 Bluenose composition survey.

Date	Activity	Weather	Personnel
7 March	Classification	Sunny, windy,	PF, MW
8 March	Classification for 1/2 day only	ice fog	PF, MW
9 March	Classification	CAVU, -37°C	PF, MW
10 March	Classification	CAVU, -41°C	PF, MW
11 March	Classification	Hi overcast, -15°C fog & low cloud in PM	PF, MW
12 March	Classification	CAVU in AM, -20°C	PF, MW
13 March	Classification for 2 hrs	Hi broken cloud, -16°C freezing rain in PM	PF, MW